Vehicle Technology and Trends 2013

Module 3

I-CAR®

Class 0:31

A-1

MODULE 3–ASIAN VEHICLE MAKERS

Topic A. Honda/Acura

Learning Objectives

The learning objectives for this module include describing features on new vehicles and technology from:

- **Honda/Acura.**
- **Infiniti.**
- **Mazda.**
- **Subaru.**
- **Toyota/Lexus/Scion.**

The learning objectives for this module include describing features on new vehicles and technology from:

- Honda/Acura.
- Infiniti.
- Mazda.
- Subaru.
- Toyota/Lexus/Scion.

Notes

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Topic A. Honda/Acura (cont'd)

A-2v

Video: Tech/Trends Trivia

Notes

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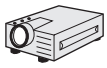
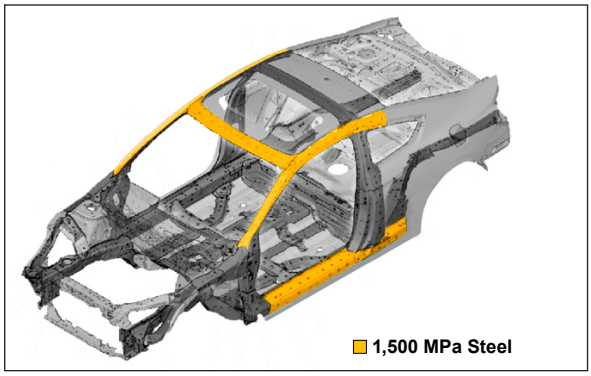
Topic A. Honda/Acura (cont'd)



A-3

2013 Honda Accord



Courtesy of American Honda Motor Co., Inc.

The 2013 Honda Accord redesign marks the 9th generation of this model. The Accord debuted in 1976.

The 2013 Accord uses the most high-strength steel in the model's history, including strengths of 780, 980 and 1,500 MPa, none of which have ever been used on an Accord. 1,500 MPa steel is used for the upper inner A-pillar and the rocker panel reinforcement on both the sedan and the coupe. On the sedan, there is also 1,500 MPa steel used for the upper B-pillar reinforcement. On the coupe, there is also 1,500 MPa steel used for the front roof crossmember and roof rail reinforcement.

With regards to repairs, Honda specifies spot welds be replaced with repair spot welds, one for one. Spot welders must be capable of generating 9,000 amps. Where spot welding cannot be done, plug welds using MIG brazing is required. Honda states to NOT replace spot welds with GMA (MIG) plug welds or do any GMA (MIG) welding on the 1,500 MPa steel. The MIG brazed plug welds directly on the 1,500 MPa reinforcements requires drilling

Notes

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Topic A. Honda/Acura (cont'd)

two 8 mm holes and filling the holes by MIG brazing. Attaching exterior panels to the 1,500 MPa reinforcements requires drilling one 8 mm hole. The locations where spot welders cannot access and where MIG brazing is required are identified in the Honda body repair information.

Notes

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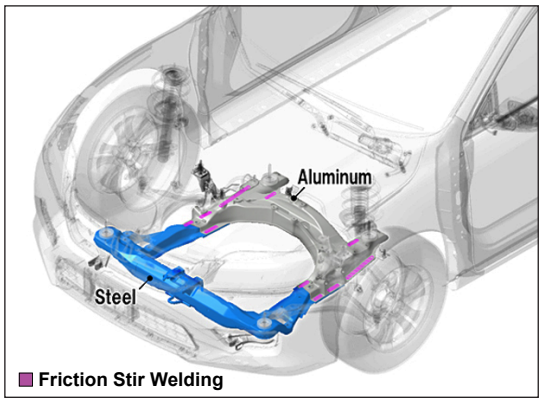
Topic A. Honda/Acura (cont'd)

A-4

2013 Honda Accord (cont'd)



Courtesy of American Honda Motor Co., Inc.

An industry first for the 2013 Accord is a combination of aluminum and steel for the front subframe (engine cradle). The main portion of the subframe is steel. Aluminum is lapped over the steel in the rear and there is an aluminum rear crossmember. Where the steel and aluminum are lapped, they are joined using friction stir welding. Unlike spot welding, friction stir welding is a factory-only process that uses pressure and friction with a spinning pin to create heat. The use of galvanized steel prevents corrosion between the dissimilar metals. Honda says the aluminum and steel subframe not only reduces weight, compared to an all-steel subframe, but increases rigidity of the suspension mounting points. Honda plans to expand the aluminum and steel subframe to other models in the future.

Honda is planning a plug-in hybrid version of the Accord, and a conventional two-mode hybrid. One difference with the body construction, at least for the plug-in hybrid, is a completely aluminum subframe instead of the aluminum and steel combination.

Notes

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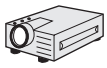
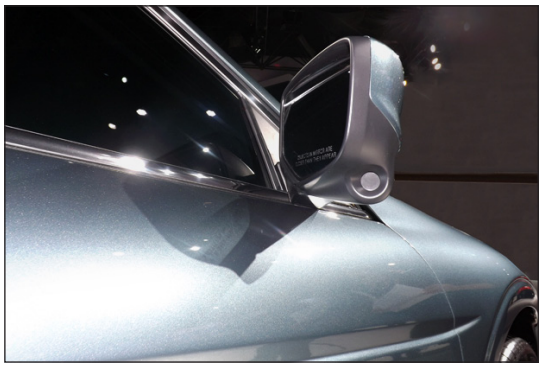
Topic A. Honda/Acura (cont'd)



A-5

Honda Commits To Cameras



Honda has made a commitment to cameras for 2013. Over 94% of the 2013 Honda lineup is equipped with standard rearview cameras, 100% of the truck lineup.

The 2013 Accord and Crosstour debut three other camera-based systems as options. One is Honda's a forward crash warning feature. With this system, a camera is mounted behind the windshield to warn drivers of a potential collision in front.

Another is a lane departure warning system, which uses the same camera to alert the driver if the vehicle is moving out of its lane.

The third system is a lane-watch display feature. A camera mounted on the passenger mirror provides an enhanced view of the road on the right side, normally not seen by the driver.

None of these systems are linked to the steering or braking systems.

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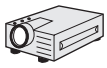
Topic A. Honda/Acura (cont'd)



A-6

Honda Fit EV Slow Rollout

The pure-electric Honda Fit EV is said to get 123 miles on a single charge.

A feature of the Honda Fit EV is that it can send a charging update to a smart phone.

Honda plans a slow rollout of the Fit EV that started with leasing only to the California and Oregon markets. In 2013, select East Coast markets were added.

Notes

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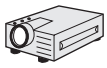
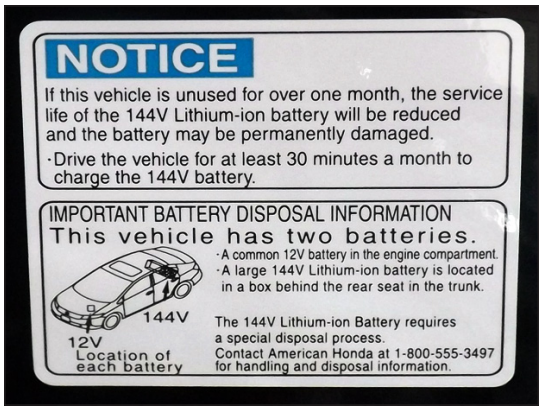
Topic A. Honda/Acura (cont'd)



A-7

Acura Notice For Lithium-Ion Batteries


NOTICE
If this vehicle is unused for over one month, the service life of the 144V Lithium-ion battery will be reduced and the battery may be permanently damaged.
·Drive the vehicle for at least 30 minutes a month to charge the 144V battery.
IMPORTANT BATTERY DISPOSAL INFORMATION
This vehicle has two batteries.
·A common 12V battery in the engine compartment.
·A large 144V Lithium-ion battery is located in a box behind the rear seat in the trunk.
144V
12V
Location of each battery
The 144V Lithium-ion Battery requires a special disposal process.
Contact American Honda at 1-800-555-3497 for handling and disposal information.

An underhood sticker on the Acura ILX Hybrid indicates that lithium-ion batteries have a discharge problem if they sit too long. The notice states that:

- there may be permanent damage to the battery if unused for one month.
- the vehicle should be driven for at least 30 minutes per month to recharge the high voltage battery.

This is similar to warnings for nickel-metal hydride (NiMH) batteries, showing that the battery systems are similar in some respects.

Notes

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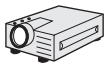
Topic A. Honda/Acura (cont'd)



A-8

Second Generation Acura NSX

There is a new generation of the Acura NSX on the horizon. Acura stopped production on the first generation sports car in 2005. The second generation NSX:

- will be a gasoline/electric hybrid.
- will have electric motors at each front wheel.
- is scheduled for a 2015 release.

The original NSX, released in 1990, was the first aluminum-intensive vehicle. The 2015 NSX is being built in Ohio.

Notes

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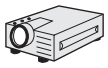
Topic B. Infiniti/Nissan



B-1v

Video: Technology On Infiniti JX35

This video shows some of the special features on the 2013 Infiniti JX35.

The JX35 shares its unibody platform with the Nissan Pathfinder, which went from full-frame to unibody for 2013.

Notes

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Topic C. Mazda

C-1

Bumper Cover Material On Mazda CX-5

Mazda has made progress on a new bumper cover material featured on the 2013 CX-5. This bumper cover material:

- combines polypropylene (PP) with rubber. It has the same rigidity as standard PP, but with less weight. This material is exclusive to the CX-5 for 2013, but it will be used on future Mazda models, since there is a weight reduction.
- repairs and refinishes the same as standard PP.

The Mazda CX-5 also has 1,800 MPa front and rear bumper reinforcements, which may be the strongest steel made to date. Reports say the next generation CX-6 will have B-pillar reinforcements in the 1,500 MPa range, similar to the 2013 Lexus GS.

Notes

Objectives Worksheet

Mazda has made progress on a new bumper cover material featured on the 2013 CX-5. This bumper cover material combines polypropylene (PP) with rubber. This material will be used on future Mazda models, since there is a weight reduction. The material repairs and refinishes the same as standard PP.

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Topic C. Mazda (cont'd)

C-2

Mazda "SKYACTIV" Technology

Courtesy of Mazda Motor Corp.

Mazda is lightening the vehicle by redesigning the powertrain, called "SKYACTIV" technology.

The primary feature of SKYACTIV technology is the engine, which has an exceptionally high compression ratio of 13:1, similar to Formula One race cars. By redesigning other parts of the drivetrain, Mazda was able to overcome the disadvantages of high compression, such as poor fuel efficiency.

In Europe and Asia, the CX-5 is available as a diesel.

Notes

The engine on the screen, the SKYACTIV-G refers to "gasoline" engine. Mazda also makes a SKYACTIV-D diesel engine, but it is not available in the United States.

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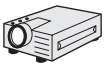
Topic C. Mazda (cont'd)



C-3v

Video: Tech/Trends Trivia

Notes

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Topic D. Subaru

D-1

Eyesight Driver Assistance

Forward-Facing Cameras

The 2013 Subaru Legacy and Outback have an autonomous braking feature option called Eyesight Driver Assistance, which:

- automatically applies the brake when the vehicle is traveling up to 19 mph and in situations where the driver should but does not brake.
- combines adaptive cruise control, pre-collision braking, lane departure, and sway warning into this one system.
- also includes a feature called Lead Vehicle Start Alert which alerts the driver when, after stopping, the vehicle in front starts moving.
- has two forward-facing cameras on the upper console, either side of the rearview mirror, as the main identification parts.

Notes

Objectives Worksheet

The 2013 Subaru Legacy and Outback have an autonomous braking feature option called Eyesight Driver Assistance.

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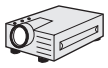
Topic D. Subaru (cont'd)



D-2

Eyesight Driver Assistance (cont'd)

The Eyesight Driver Assistance system:

- includes a caution label on the headliner that warns to never touch or wipe the camera lenses, which could damage or contaminate the lens.
- autonomous braking feature can be overridden by the driver at any time by simply applying the brakes.

Though Eyesight Driver Assistance is only available as an option on the 2013 Legacy and Outback, it should spread to other Subaru models in the future.

Notes

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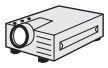
Topic E. Toyota/Lexus/Scion



E-1

Lexus GS 350

= 1,500 MPa Steel

What stands out on the 2013 Lexus GS from a body point of view is the strength of the hot-stamped, boron-alloyed steel in the B-pillar and roof rail reinforcements. It is rated at 1,500 MPa. This is the strongest steel to date used by Lexus or Toyota. Previous Lexus and Toyota vehicles have UHSS with a maximum strength of 980 MPa.

Also on the Lexus GS:

- is an aluminum hood, door skins, and bumper reinforcement.
- there are sectioning procedures on the front and rear rails, outer pillars, and rocker panels.

Notes

Objectives Worksheet

What stands out on the 2013 Lexus GS from a body point of view is the strength of the hot-stamped, boron-alloyed steel in the B-pillar and roof rail reinforcements. It is rated at 1,500 MPa. Also on the Lexus GS are an aluminum hood, door skins, and bumper reinforcement

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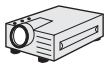
Topic E. Toyota/Lexus/Scion (cont'd)



E-2

Lexus GS 450h–The Hybrid Version

The hybrid version of the Lexus GS 350 is the GS 450h, which has a:

- vertically stacked nickel-metal hydride high voltage battery. The stacking of the battery is for adding room in the trunk area.
- night view infrared system option. Parts of the system include a camera in front of the rearview mirror, infrared lamps within the headlamp assemblies, and a display on the dash.

Notes

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Topic E. Toyota/Lexus/Scion (cont'd)

E-3

New Scion For 2013: FR-S

There is a new Scion for 2013, the FR-S. The FR-S is a compact rear-wheel drive sports car. That is what FR-S stands for: Front-engine, Rear-wheel drive, Sport. The FR-S:

- four-cylinder engine is the result of a joint effort between Toyota and Subaru. The FR-S platform is also shared with Subaru for the 2013 Subaru BRZ.
- contains 1,500 MPa steel on the roof crossmember that spans between the B-pillars. There are no repairs allowed on the roof or floor crossmembers that are HSS or stronger. On all Toyota, Lexus, and Scion vehicles, these crossmembers are considered structural reinforcements, and Toyota forbids straightening structural reinforcements.
- contains 980 MPa steel on the B-pillar and roof rail reinforcements, and the front roof crossmember.
- has sectioning procedures on the lower front rails and the outer A-pillars, outer rocker panels, outer B-pillars, and quarter panels. The rearmost portion of the trunk floor pan can also be sectioned.

Notes

Objectives Worksheet

There is a new Scion for 2013, the FR-S. The FR-S is a compact rear-wheel drive sports car. The four-cylinder engine is the result of a joint effort between Toyota and Subaru. The FR-S platform is also shared with Subaru for the 2013 Subaru BRZ.

The FR-S:

- contains 1,500 MPa steel on the roof crossmember that spans between the B-pillars. There are no repairs allowed on the roof or floor crossmembers that are HSS or stronger.
- has sectioning procedures on the lower front rails and the outer A-pillars, outer rocker panels, outer B-pillars, and quarter panels. The rearmost portion of the trunk floor pan can also be sectioned.

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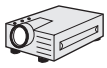
Topic E. Toyota/Lexus/Scion (cont'd)



E-4

Toyota Prius Family Grows

There is another Toyota Prius hybrid model for 2013. The Prius C, for "city":

- is the fourth Prius model to be offered. Previous Prius models include the Prius, now in its third generation, the Prius "V" wagon, and the Prius plug-in hybrid.
- is based on the Yaris platform. The Prius C is smaller than the original Prius and also has a smaller engine.
- has an aluminum hood and rear hatch.
- has a 144-volt NiMH battery under the back seat. The seat support frame is also the battery module protection area.

The Prius C is still a full hybrid.

Notes

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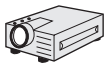
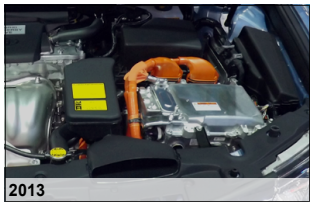
Topic E. Toyota/Lexus/Scion (cont'd)



E-5

Toyota Camry Hybrid Cable Routing



On the Toyota Camry Hybrid, Toyota has rerouted a pair of high voltage cables so they are less vulnerable in a collision. The connections:

- are to the hybrid inverter/converter under the hood. As with most high voltage cables, they are colored bright orange.
- were formerly connected in front, a potentially vulnerable position. This was pointed out in the "I-CAR Hybrid Electric And Alternative Fuel Vehicles (ALT02)" course.
- are now on the backside of the inverter/converter.

Notes

Objectives Worksheet

On the Toyota Camry Hybrid, Toyota has rerouted a pair of high voltage cables so they are less vulnerable in a collision. The connections are to the hybrid inverter/converter under the hood. Formerly in front, the cables are now connected on the backside of the inverter/converter. As with most high voltage cables, they are colored bright orange.

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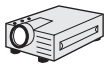
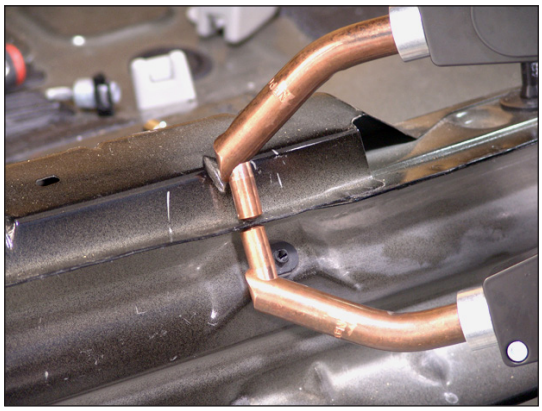
Topic E. Toyota/Lexus/Scion (cont'd)



E-6

Toyota Welding Substitutions



A Toyota Collision Repair Information Bulletin (CRIB) issued in December 2011 authorizes the use of spot welding for several repairs calling for GMA (MIG) plug welds in the service information. This includes everything from exterior panel pinchweld areas to structural applications, such as rail flanges.

CRIB number 181 specifies that the repair spot welds should match factory weld size, strength, and appearance. Strength can only be validated by destructive testing on sample metal of the same thickness and composition as the vehicle part being welded. If the repair welds are larger or smaller than the factory welds, the electrode tips should be resized as necessary to match. If size, strength, and appearance are matched, it is only required to match the same number of factory spot welds, not add one-third more, as the Toyota service information has long maintained. Repair spot welds should not be made over factory spot welds.

Notes

Objectives Worksheet

A Toyota Collision Repair Information Bulletin (CRIB) issued in December 2011 authorizes the use of spot welding for several repairs calling for GMA (MIG) plug welds in the service information. This includes everything from exterior panel pinchweld areas to structural applications, such as rail flanges.

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Topic E. Toyota/Lexus/Scion (cont'd)

GMA (MIG) plug welds should be used in areas where the spot welding arms cannot access both sides of the flange, and where spot welding strength does not prove adequate in the test welding process.

CRIB 181

Notes

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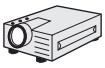
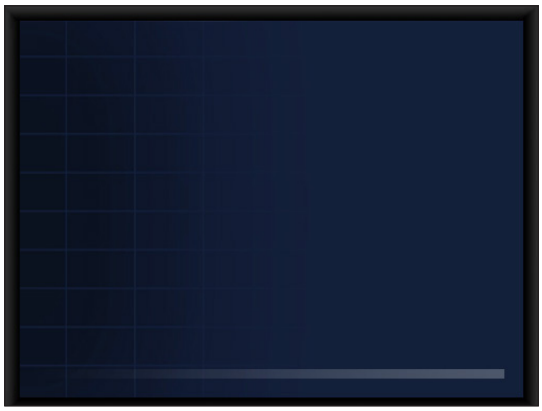
Topic E. Toyota/Lexus/Scion (cont'd)



E-7v

Video: Tech/Trends Trivia



Notes

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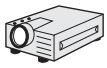
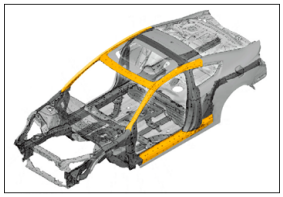
Topic F. Conclusion



F-1

Conclusion



Topics covered in this module included features on new vehicles and technology from:

- Honda/Acura.
- Infiniti.
- Mazda.

Notes

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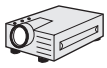
Topic F. Conclusion (cont'd)



F-2

Conclusion (cont'd)

Topics covered in this module included features on new vehicles and technology from:

- Subaru.
- Toyota/Lexus/Scion.

Notes

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